

```

graph TD
    101[display a first image at a first resolution level] --> 102[IDENTIFY A FIRST LOCATION IN THE FIRST IMAGE OVER WHICH A CURSOR IS PLACED BY A USER]
    102 --> 103[GENERATE A SECOND IMAGE AT A SECOND RESOLUTION LEVEL BASED ON THE NUMBER OF MOUSE CLICKS]
  
```

Figure 1

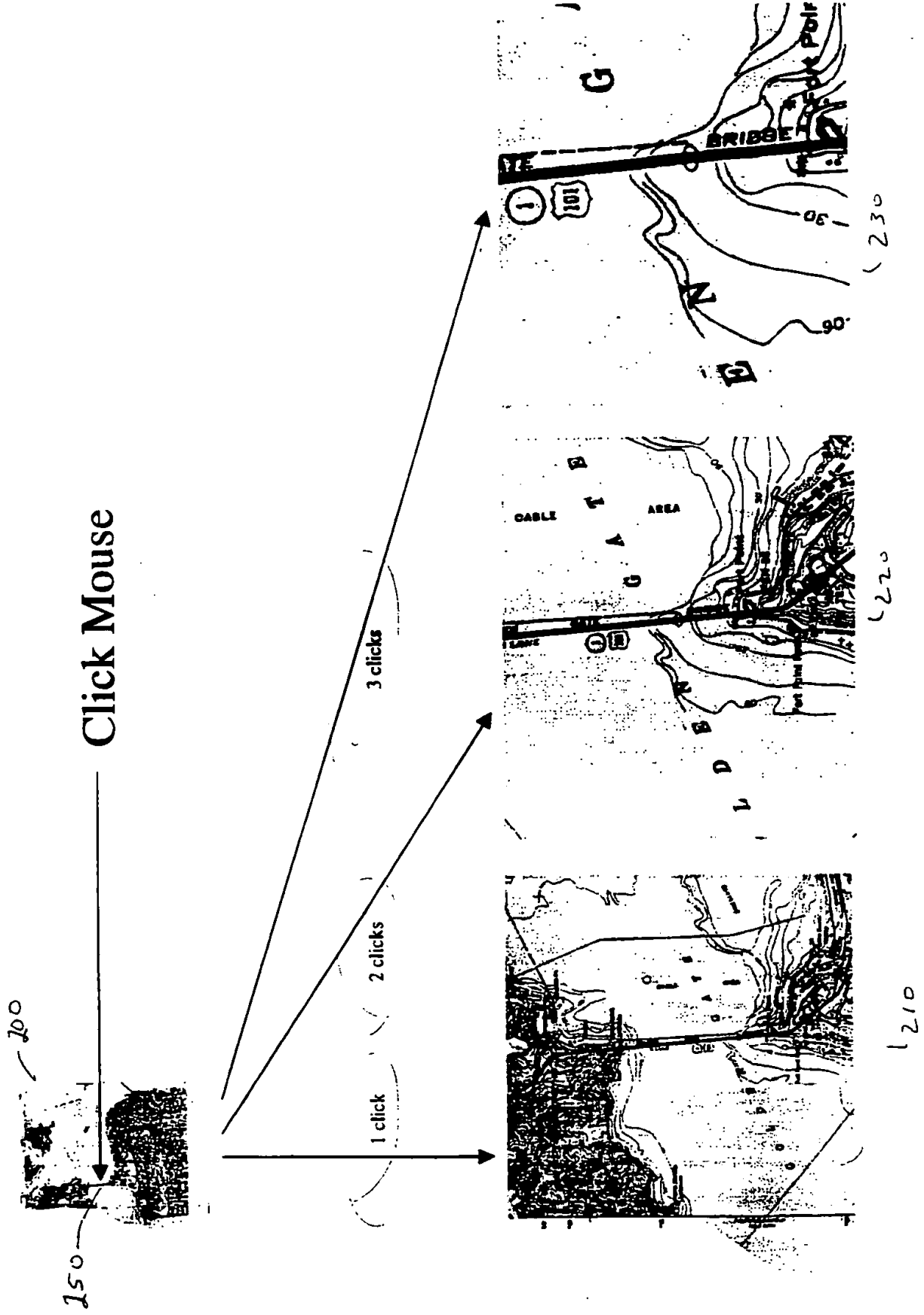


Figure 2

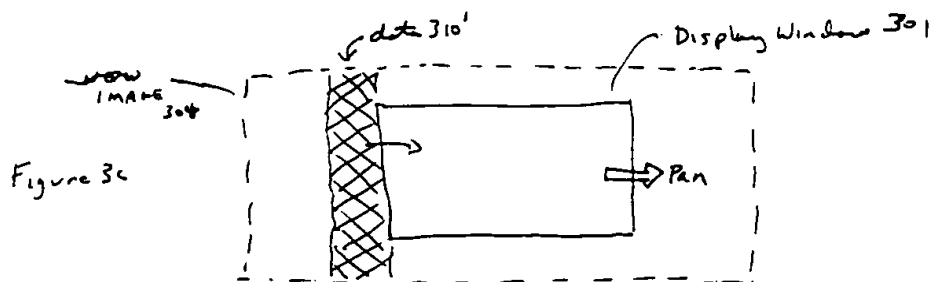
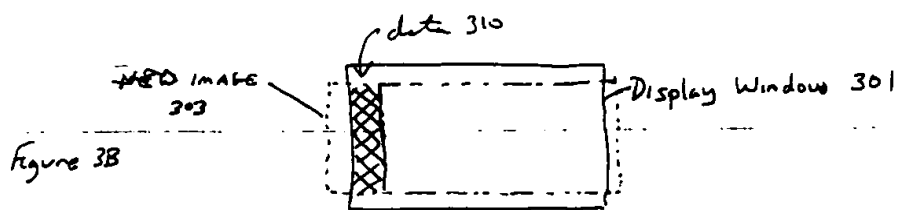
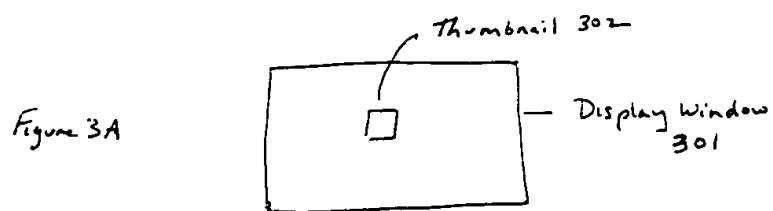


Figure 3

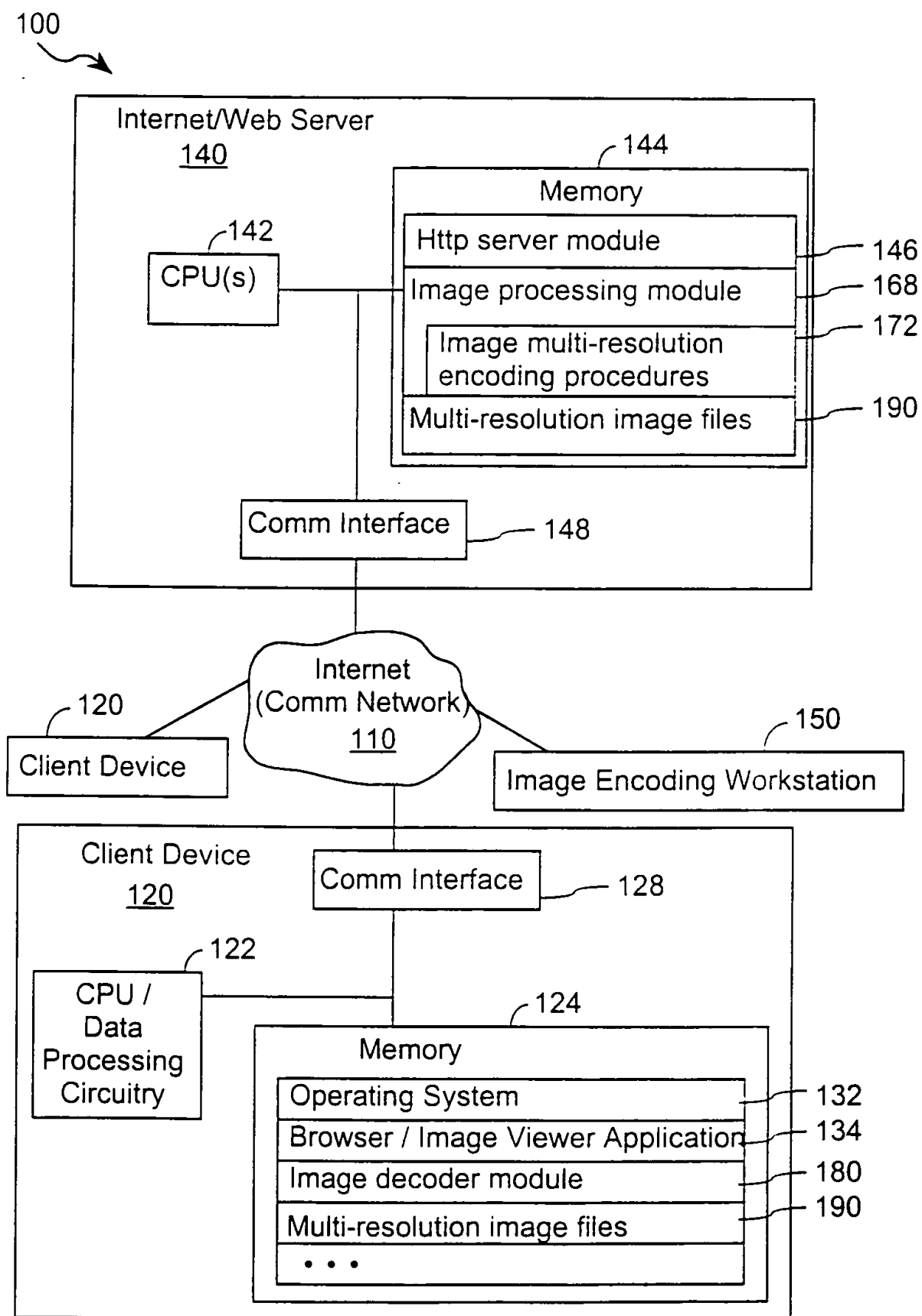


FIG. 4

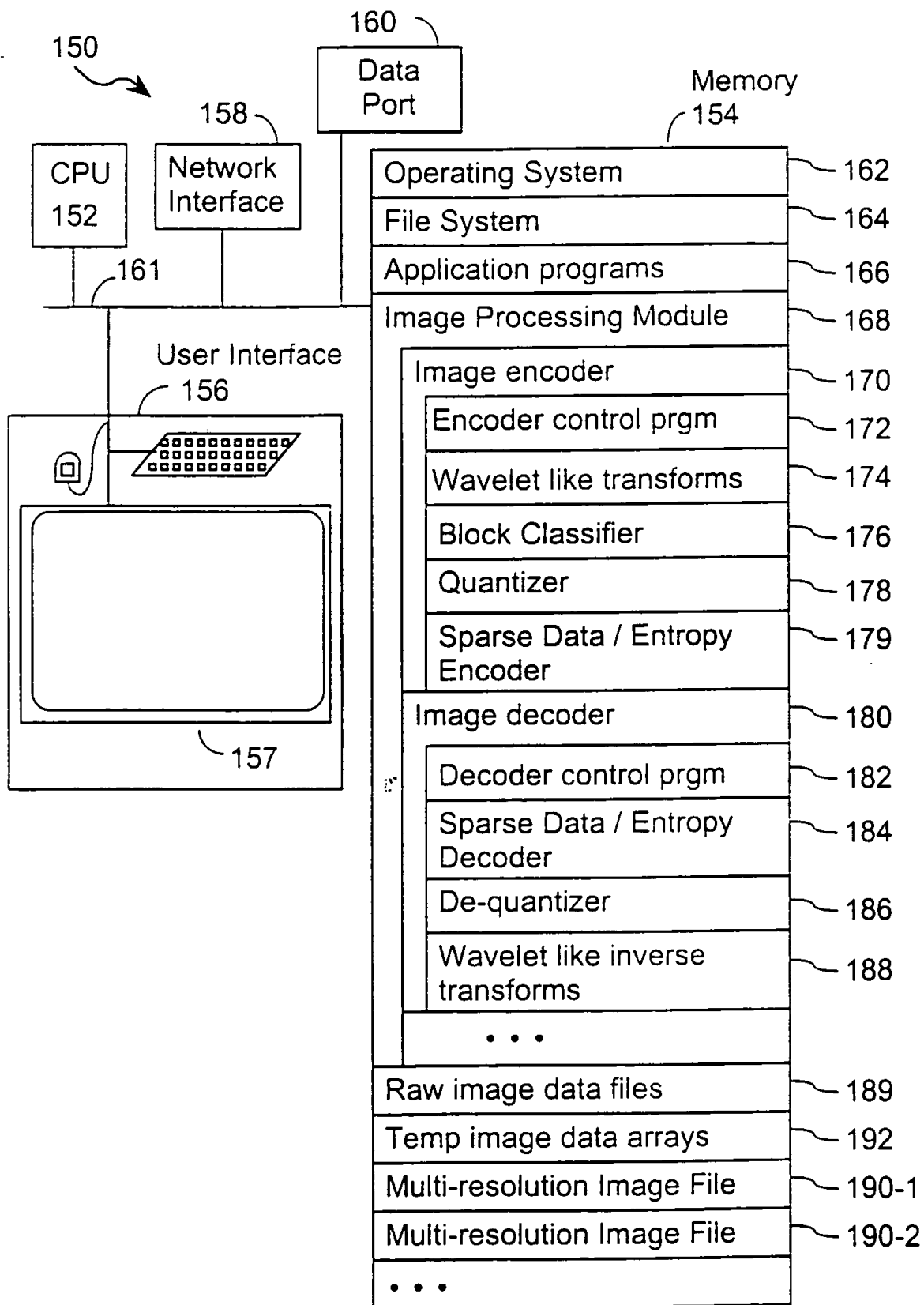


FIG. 5

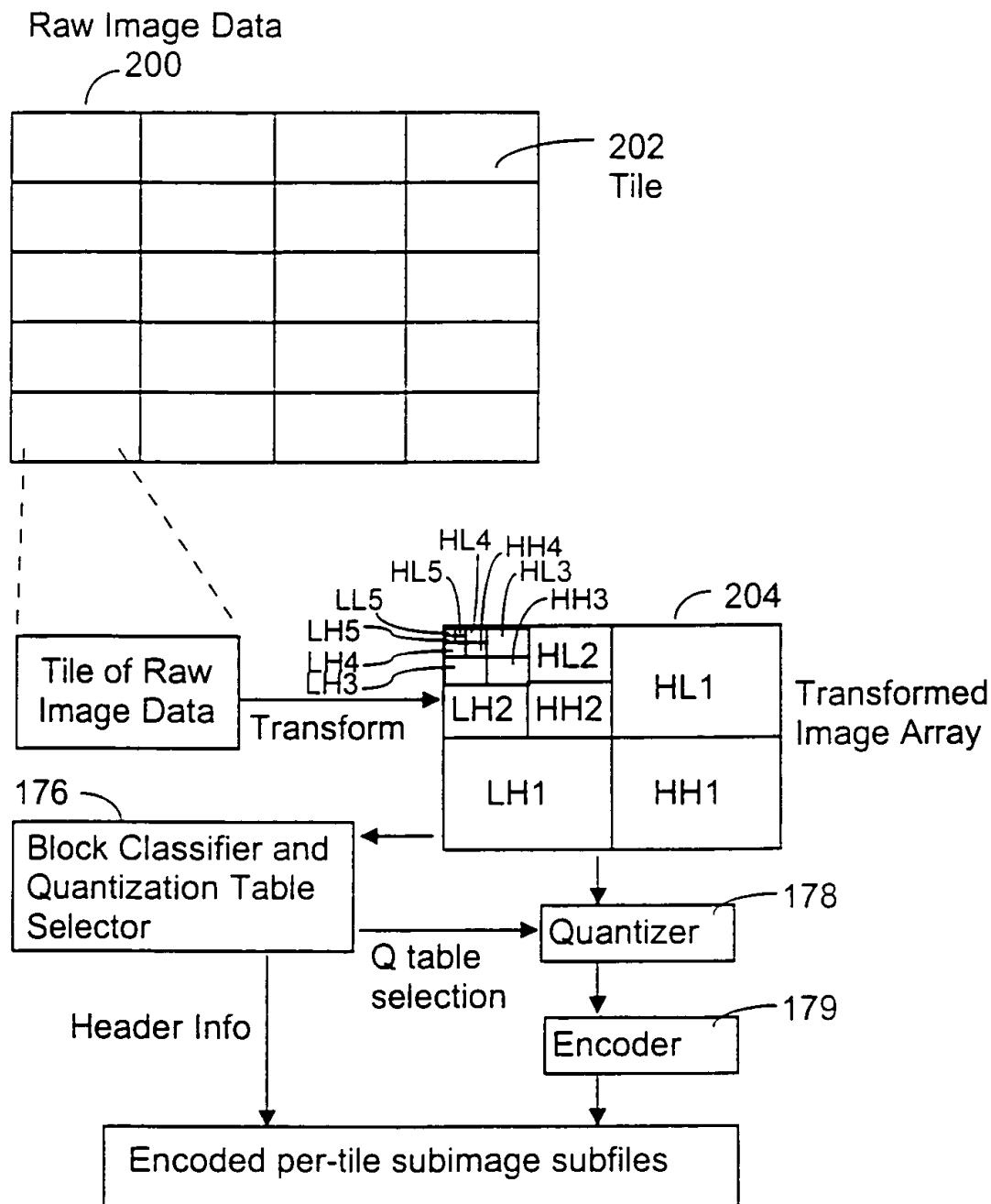


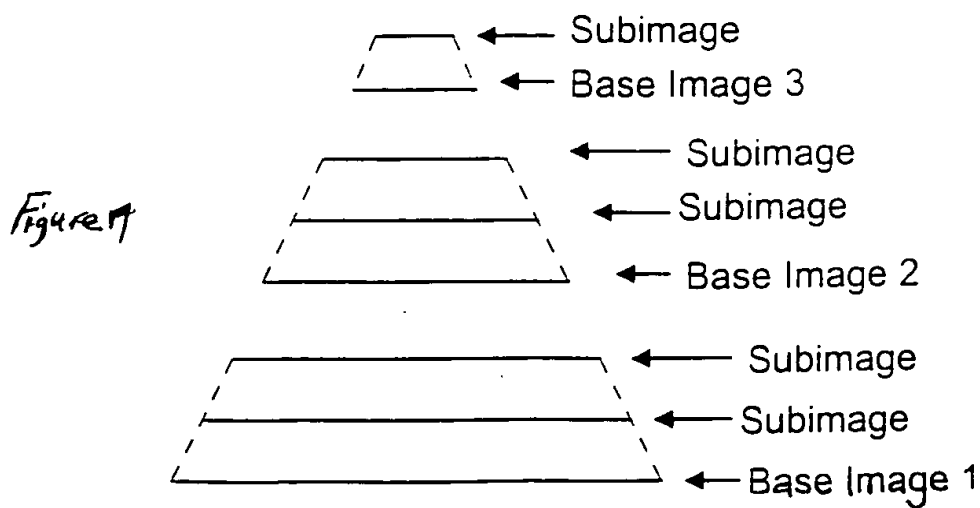
FIG. 6A

Spatial frequency subbands

LH5		HL5		HL4		HH4	
LH4		HL4		HL3		HL2	
LH3		HH3		HL2		HL1	
LH2		HH2		HL1		HL1	
LH1		HH1		HL1		HL1	

NQS subbands

FIG. 6B



[illegible]

-194

-199

Base Image Header
BitStream 1a
BitStream 1b
BitStream 2a
⋮
Bitstream N

-209

-208

1

208

1

1

1

1

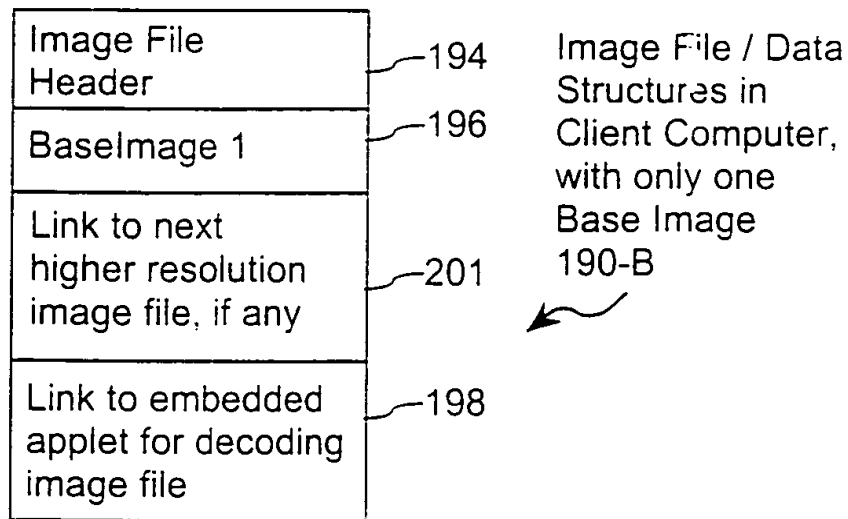


FIG. 8B

Image File (Encoded Image Data Structure)
190-C

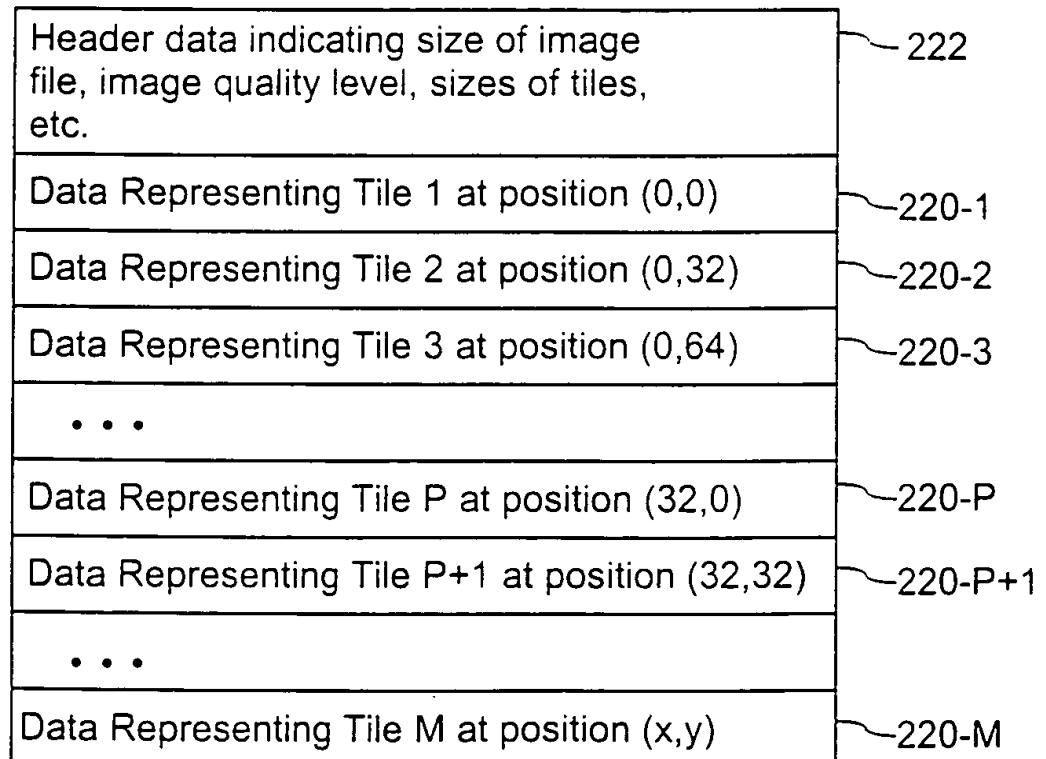


FIG. 8C

Data Representing One Tile t
220

Header Data: offset pointers to bitstreams, Q table ID, etc.	224
Bitstream 1a of Tile t: Significant part of LL ₅ , HL ₅ , LH ₅ and HH ₅ , through HL ₃ , LH ₃ and HH ₃ , with LL ₅ , HL ₅ , LH ₅ and HH ₅ , encoded as a single NQS block	226-1a
Bitstream 1b of Tile t: Mid-Significant part of LL _N through HL ₃ , LH ₃ and HH ₃ .	226-1b
Bitstream 2a of Tile t: Significant parts of HL ₂ , LH ₂ and HH ₂	226-2a
Bitstream 1c of Tile t: Insignificant part of LL _N through HL ₃ , LH ₃ and HH ₃ .	226-1c
Bitstream 2b of Tile t: Insignificant parts of HL ₂ , LH ₂ and HH ₂	226-2b
Bitstream 3 of Tile t: HL ₁ , LH ₁ and HH ₁ (all bitplanes)	226-3

FIG. 8D

Data Representing One Base Image + 2 Subimages
196A

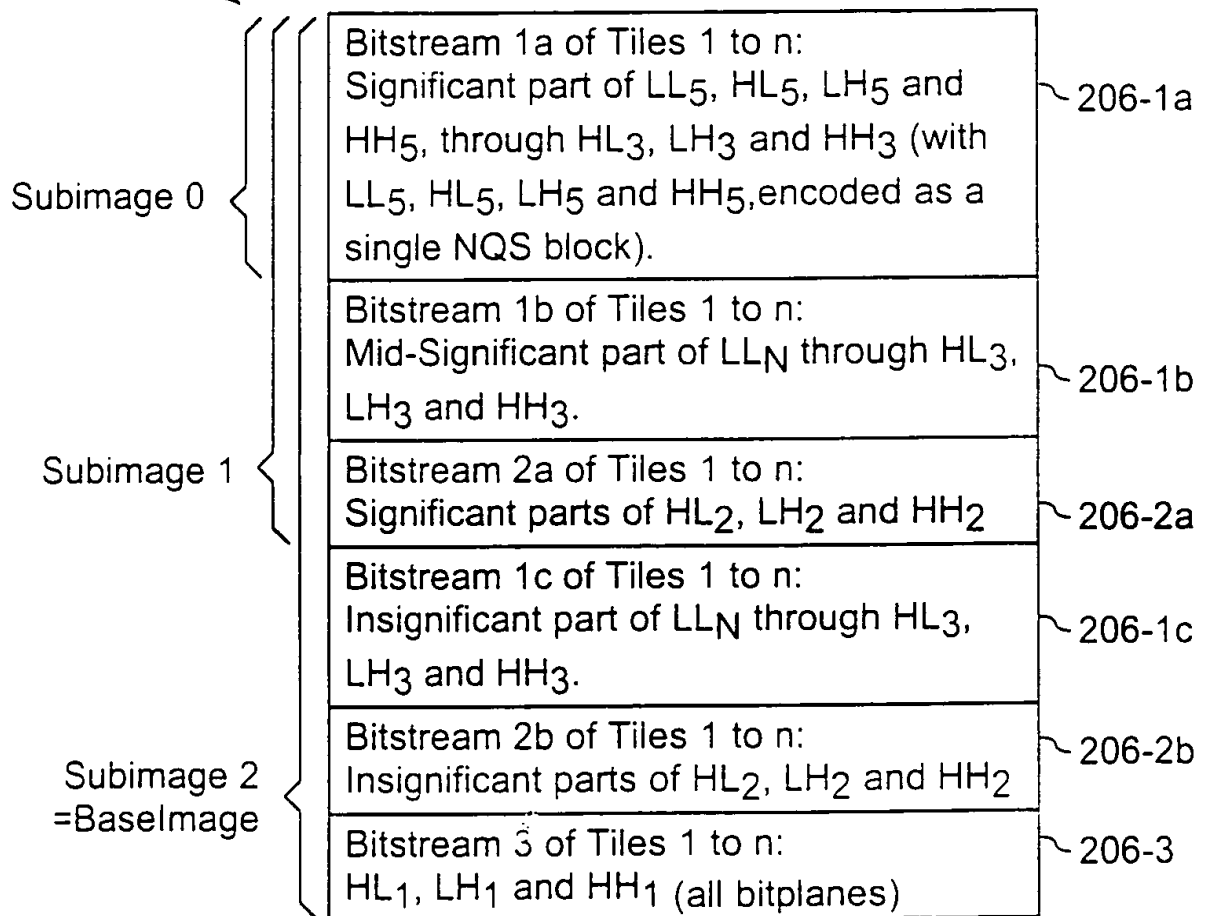
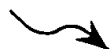


FIG. 8E

```
graph TD
    250[Capture image (or receive raw image data)] --> 252[Determine number (L, K) of tiles needed to cover the image data.]
    252 --> 254
    subgraph 254 [ ]
        direction TB
        L1[For r = 0 to L-1 {]
        L2[For c = 0 to K-1 {]
        L3[h = r x 32]
        L4[w = c x 32]
        L5[Transform tile at h,w to generate array of transform coefficients]
        L6[Classify tile and select quantization table]
        L7[Quantize transform coefficients]
        L8[Encode quantized transform coefficients]
        L9[}]
        L10[}]
    end
    254 --> 256[Reorganize encoded data into resolution ordered bitstreams, and store in image file.]
    256 --> 257{More base images?}
    257 -- N --> Done[Done]
    257 -- Y --> 258[Subsample and anti-alias the current base image to produce a reduced size base image.]
    258 --> 254
```

FIG. 9

Forward Transform



$[X_0, X_1, \dots, X_{2n-1}]$



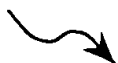
$[L_0, L_1, \dots, L_{n-1}; H_0, H_1, \dots, H_{n-1}]$

FIG. 10A

X_0	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}
Y_0		Y_1		Y_2		Y_3		Y_4		Y_5		Y_6		Y_7	
L_0		L_1		L_2		L_3		L_4		L_5		L_6		L_7	
H_0		H_1		H_2		H_3		H_4		H_5		H_6		H_7	

FIG. 10B

Inverse Transform



$[L_0, L_1, \dots, L_{n-1}; H_0, H_1, \dots, H_{n-1}]$



$[X_0, X_1, \dots, X_{2n-1}]$

FIG. 10C

	$u_{ij}^{(3)}$ HL ₃	$u_{ij}^{(2)}$ HL ₂	$u_{ij}^{(1)}$ HL ₁
$v_{ij}^{(3)}$ LH ₃	$w_{ij}^{(3)}$ HH ₃		
$v_{ij}^{(2)}$ LH ₂	$w_{ij}^{(2)}$ HH ₂		
$v_{ij}^{(1)}$ LH ₁			
			$w_{ij}^{(1)}$ HH ₁

FIG. 11

Encode Image Procedure (Tile t):

Repeat for each NQS subband

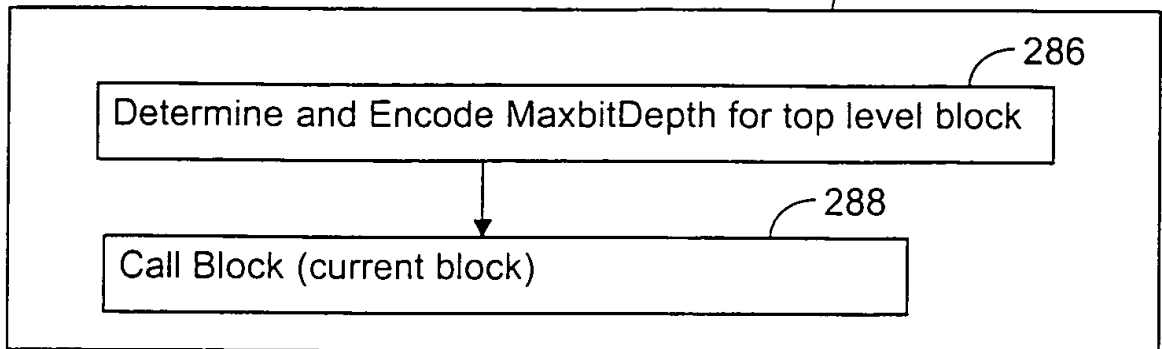
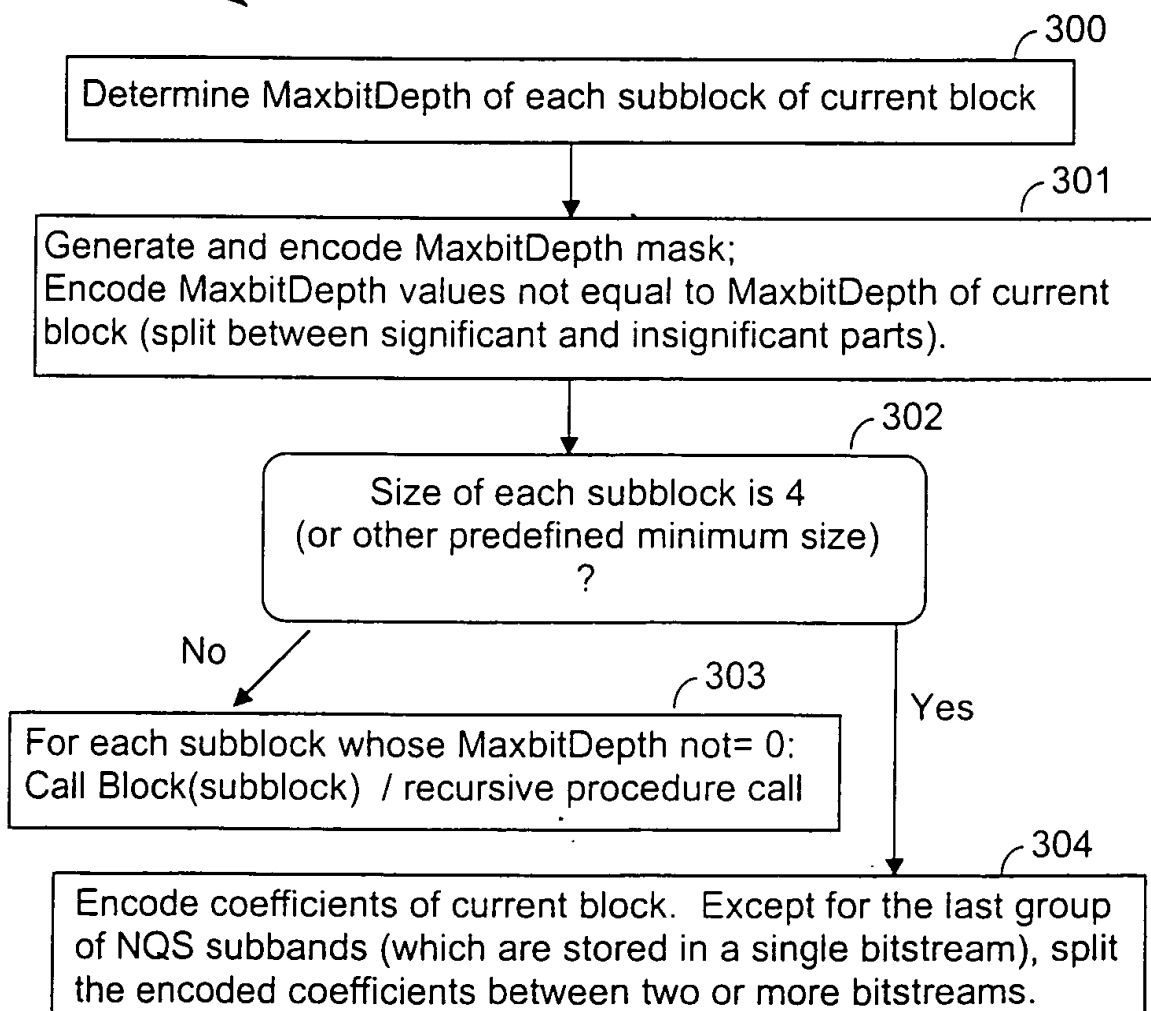


FIG. 13A

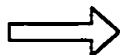
Block Procedure:

Figure 13B



block m_0

m_1	m_2
m_3	m_4



mask indicating which $m_i = m_0$.

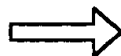
encoded MaxbitDepth values for subblocks where $m_i \neq m_0$.

$m_i = \text{MaxbitDepth of block } i$

FIG. 14 A

5	0
3	2

MaxbitDepth values



Mask = 1 0 0 0

→ 111 (Huffman code)

Encoded Maxbit values:

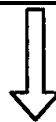
m_2 : 0000

m_3 : 01

m_4 : 001

MaxbitDepth encoded representation:

111 0000 01 001



MaxbitDepth encoded representation:

significant part:

mask, significant part of m_2 , m_3 , m_4 :

111 00 01 00

insignificant part:

00 1

FIG. 14 B

FILED OCT 19 2006

Block Classifier and
Quantization Table
Selector

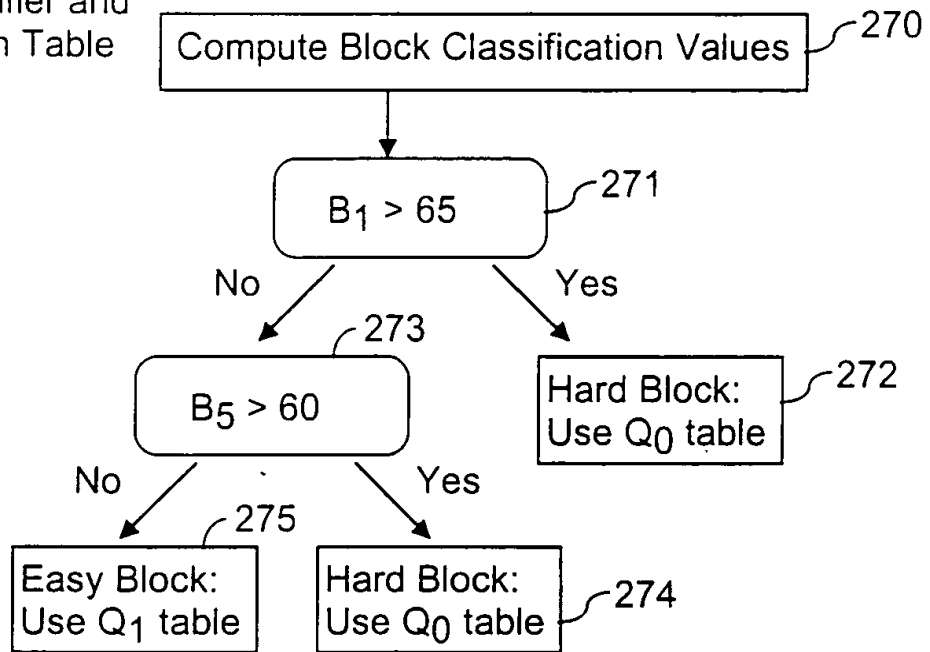


FIG. 12

Example

Encoding of Coefficients: 31, 0, -5, -2

significant part (threshold=3 bits):
POS 1, NEG

insignificant part:
111, 01, NEG 0

(MSB of each coefficient is known from MaxbitDepth values)

FIG. 14 C

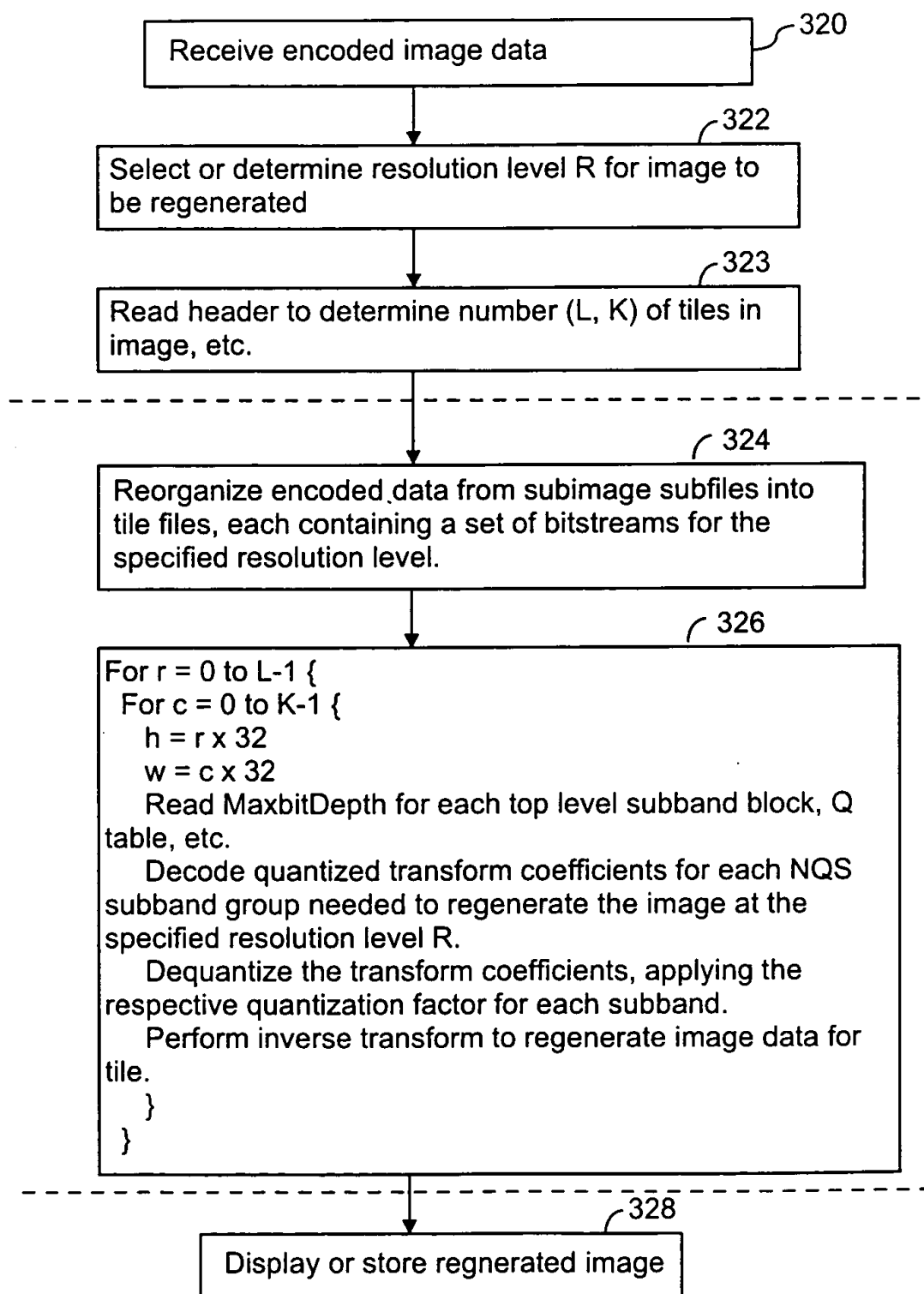


FIG. 15

Decode Image Procedure (Tile t):

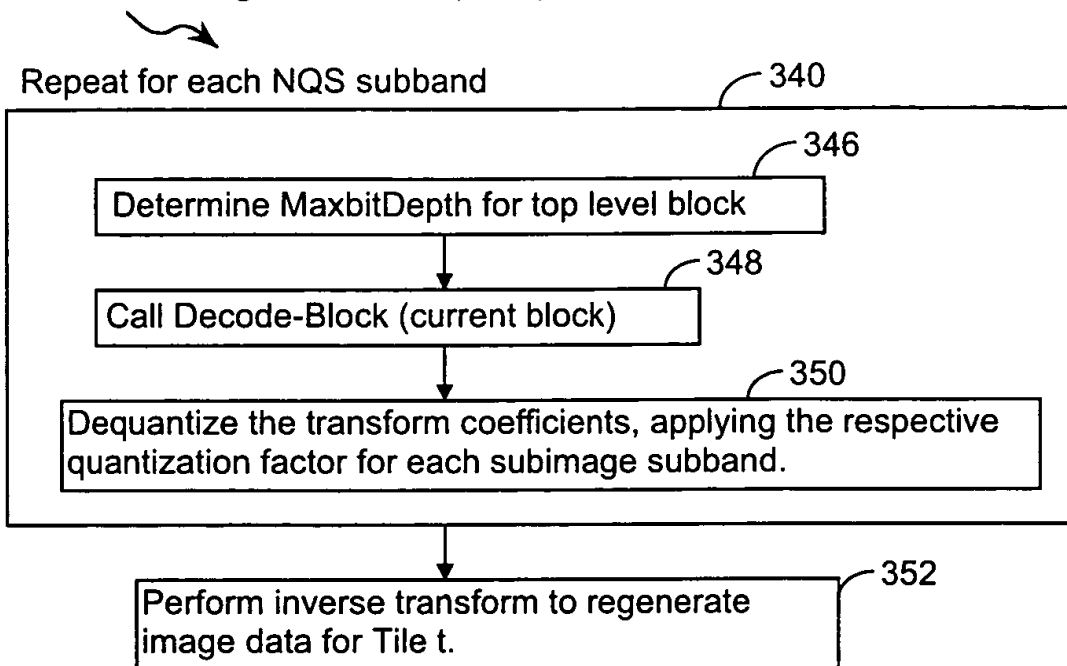


FIG. 16A

Decode-Block Procedure:

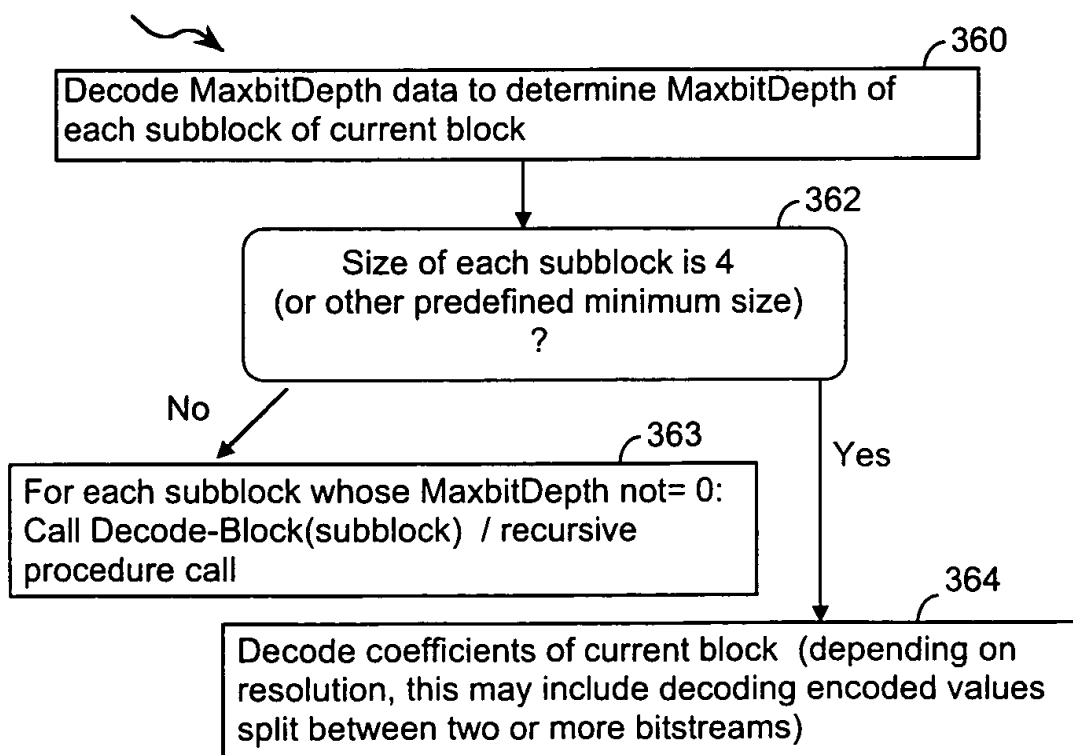


FIG. 16B

FIG. 17

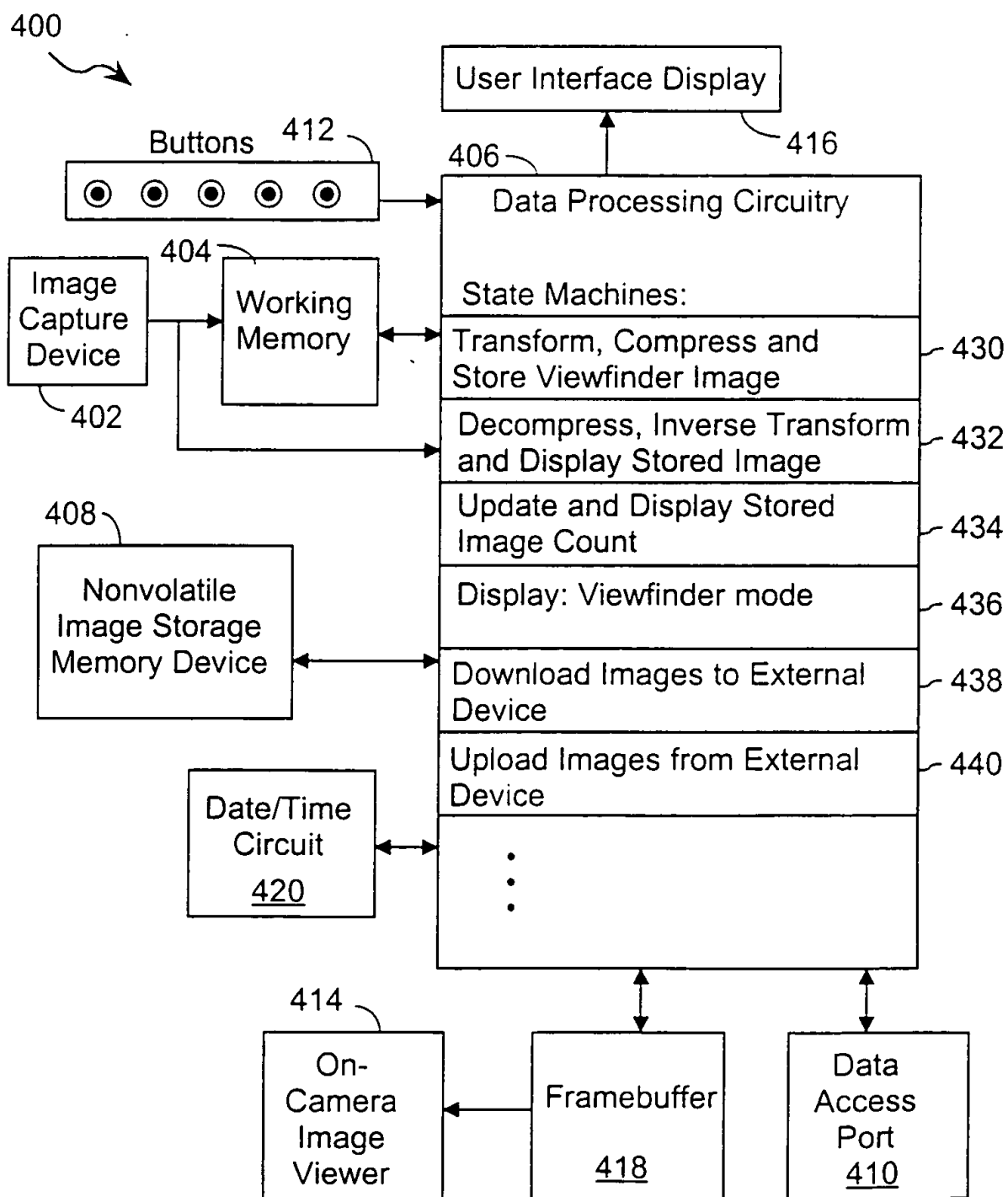


FIG. 17

Client Image Download, followed by Zoom and then Pan

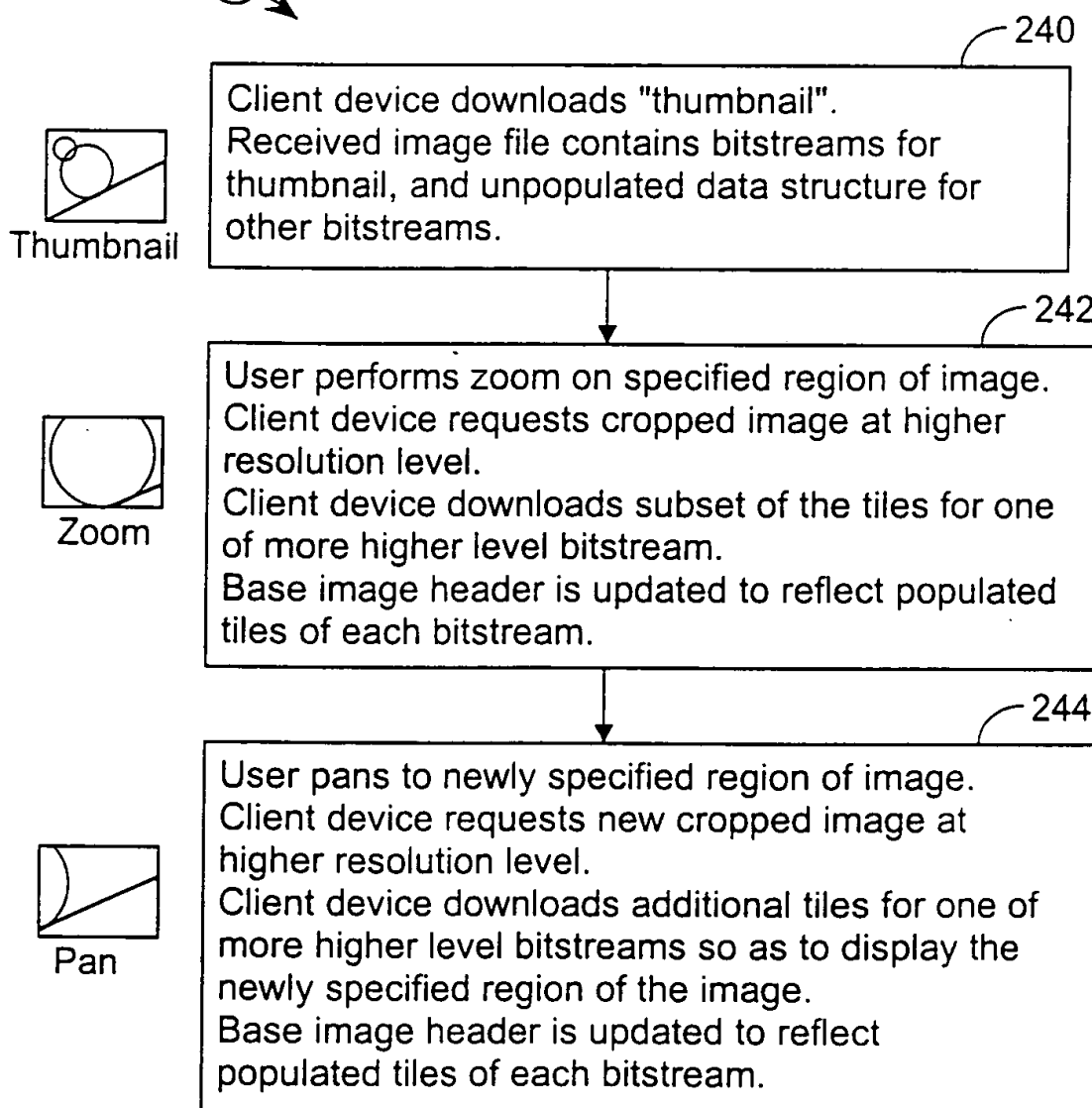


FIG. 18